CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.06/VC/CSR-09/133d/CEMENT/2016-17 Date: 02.09.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Byatarayanapura Sub Division, BBMP, Bangalore.
*AGENCY		**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
*NAME OF THE WORK	:	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE		AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	01.09.2016
PERIOD OF TESTING	:	01.09.2016 to 02.09.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	30.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	155 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	485 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

****

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Job No.: CTCE/BBMP/W.No.06/VC/CSR-09/133d/SAND-Gradation/2016-17 : 02.09.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
* Name of Work	: Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Technical Reference	: IS : 2386 Part 1 - 1963 RA-2007
Sample ID	: Fine Aggregates
Sample Received on	: 01.09.2016
Date of Testing	: 02.09.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	91.80	90-100	90-100	90-100	95-100
2.36	72.00	60-95	75-100	85-100	95-100
1.18	50.00	30-70	55-90	75-100	90-100
600 Micron	21.00	15-34	35-59	60-79	80-100
300 Micron	10.00	5-20	8-30	12-40	15-50
150 Micron	4.80	0-10	0-10	0-10	0-15

*Information is furnished by the Customer/Representative.

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.06/VC/CSR-09/133d/AGG/GR/2016-17 : 02.09.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
* Name of Work	: Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 01.09.2016
Date of Testing	: 02.09.2016

Total Wt. of Aggregates in gms= **7000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.86	95-100	85-100
20	38.57	30-70	0-20
10	20.71	10-35	0-5
4.75	3.79	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/W.No.06/VC/CSR-09/133d/AGG/GR/2016-17 : 02.09.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
* Name of Work	: Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (20mm)
Sample Received on	: 01.09.2016
Date of Testing	: 02.09.2016

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS :383-1970 (RA- 2007)	
		Graded	Single Sized
40	100	100	100
20	96.30	95-100	85-100
10	32.00	25-55	0-20
4.75	7.00	0-10	0-5

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Graded specific limits

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Job No.: CTCE/BBMP/W.No.06/VC/CSR-09/133d/CUBE/2016-17 22.09.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*Customer	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
*Agency	: **Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
*Name of the work	: Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
*Sample ID	: Cement Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
*Grade of Concrete	: M_{20}
Compressive Strength as on	: 7th day
Sample Received on	: 22.09.2016

Sl.No.	*Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	15.09.2016	22.09.2016	8.125	352.3	15.66
2	15.09.2016	22.09.2016	8.290	362.3	16.10
3	15.09.2016	22.09.2016	8.356	375.3	16.68

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Job No.: CTCE/BBMP/W.No.06/VC/WMM/Gradation/2016-17 : 20.09.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. V. Chandrappa,**
#681, Dasarahalli, Bangalore – 24.

Name of Work : Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : AEE(BS)/PR/24/2016-17 Dated: 01.09.2016

Date of Testing : 20.09.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7850**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	225	225	2.9	97.1	95-100
22.4	2505	2730	34.8	65.2	60-80
11.2	1080	3810	48.5	51.5	40-60
4.75	1105	4915	62.6	37.4	25-40
2.36	995	5910	75.3	24.7	15-30
0.600	815	6725	85.7	14.3	8-22
0.075	800	7525	95.9	4.1	0-8

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Job No.: CTCE/BBMP/W.No.06/VC/WMM/AIV/2016-17 20.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
Name of the Work	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	20.09.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	309	310	
4	Aggregate Impact value = percent fines	20.57	20.92	
	$100^* (W_2/W_1)\%$			21.07

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/VC/WMM/S-T/2016-17 20.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
Name of Work	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	20.09.2016

Result : Flakiness Index = **12.32%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index 25.58%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No: CTCE/BBMP/W.No.06/VC/CSR-09/133d/SDBC(QB)/2016-17 26.09.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer**, Byatarayanapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
*NAME OF THE WORK	:	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	24.09.2016
DATE OF TESTING	:	26.09.2016

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	82	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	46	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.06/VC/SDBC/AIV/2016-17 26.09.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
Name of the Work	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.09.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.58	20.68	20.63

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.06/VC/SDBC/Shape_T/2016-17 26.09.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
Name of Work	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.09.2016

Result : Flakiness Index = **12.36%**

Elongation Index = **13.58%**

Result : Combined Flakiness & Elongation index **25.94%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.06/VC/SDBC/Bit/2016-17 27.09.2016

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CUSTOMER	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
NAME OF THE WORK	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
SAMPLE I/D	Roads in Anam Layout, Ward No.06, BBMP, Bangalore.
DATE OF TESTING	27.09.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.50
7. Bitumen content in %	5.00	5.10
8. Average	**5.05**	

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Job No.: CTCE/BBMP/W.No.06/VC/SDBC/Bit/2016-17 27.09.2016

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
NAME OF THE WORK	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
SAMPLE I/D	Roads in Anam Layout, Ward No.06, BBMP, Bangalore.
DATE OF TESTING	27.09.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	34.25	7.21	7.21	92.79	90-100
4.75	259.6	54.65	61.86	38.14	35-51
2.36	54.26	11.42	73.29	26.71	24-39
1.18	35.15	7.40	80.69	19.31	15-30
0.3	36.25	7.63	88.32	11.68	9-19
0.075	33.13	6.97	95.29	4.71	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.25	7.64	7.64	92.36	90-100
4.75	262.5	55.32	62.96	37.04	35-51
2.36	33.15	6.99	69.95	30.05	24-39
1.18	35.12	7.40	77.35	22.65	15-30
0.3	36.35	7.66	85.01	14.99	9-19
0.075	49.25	10.38	95.39	4.61	3-8

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.06/VC/SDBC/AGG/2016-17 27.09.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. V. Chandrappa,** #681, Dasarahalli, Bangalore – 24.
Name of the Work	Improvements to Roads and Drains at Anam Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE(BS)/PR/24/2016-17 Dated: 01.09.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	27.09.2016

Total Weight of Sample: **5300** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	420	7.9	7.92	92.08	90-100	
4.75	2850	53.8	61.70	38.30	35-51	
2.36	700	13.2	74.91	25.09	24-39	
1.18	400	7.5	82.45	17.55	15-30	
0.3	300	5.7	88.11	11.89	9-19	
0.075	325	6.1	94.25	5.75	3-8	

Total Weight of Sample: **5400** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	320	5.9	5.93	94.07	90-100	
4.75	2905	53.8	59.72	40.28	35-51	
2.36	630	11.7	71.39	28.61	24-39	
1.18	420	7.8	79.17	20.83	15-30	
0.3	320	5.9	85.09	14.91	9-19	
0.075	400	7.4	92.50	7.50	3-8	

Note:

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